Natural Functional Diversity of the Yeast Galactose Network

Florent Chuffart, Eddy Caron, Gael Yvert

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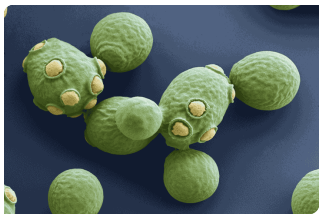
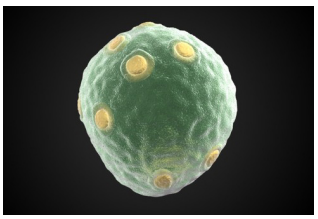
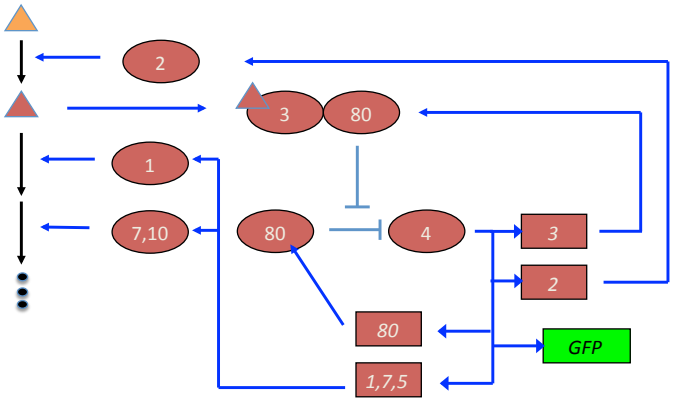
The aim of our research is to study the **natural intra-species variability** of the yeast galactose regulatory network. Our approach consists in studying more that 100 natural strains of yeast *(S. cerevisiae)*.

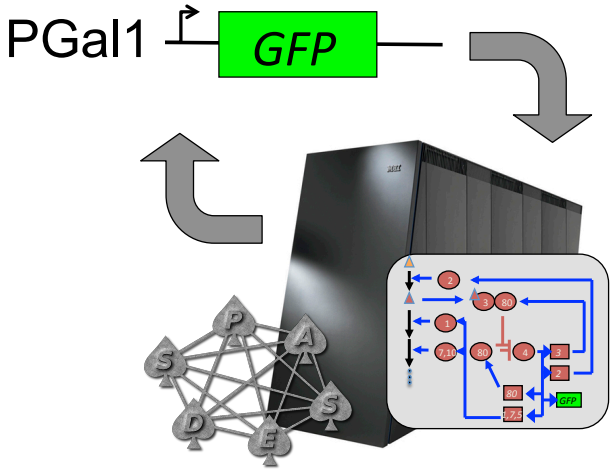




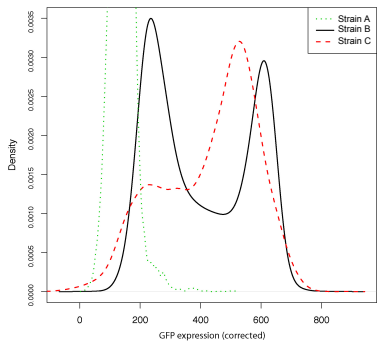
The **Galactose Regulatory Network** benefits from both complex and well-characterized [P.J. Bhat, Galactose Regulon of Yeast, 2008] features.

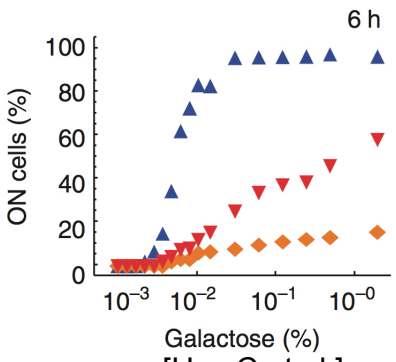


We use a **Green Fluorescent Protein** (GFP) reporter under the control of the Gal1 Promoter and make single-cell acquisitions by flow cytometry. We will put in perspective **in vivo** experiments with **in silico** modelling, based on the models of [M. Acar et al., Nature, vol 435, 12 may 2005], [S. A. Ramsey et al., nature genetics, WIREs SysBio, vol 38, num 9, sept 2006], [V. R. Pannala, Vol 2, Jan/Feb 2010] [Hsu C. et al., Nat Commun. 2012 Feb 21;3:682] we will build a simulator and perform dynamic simulations of the galactose response using SPADES. SPADES is **high performance computing** platform targeting different supercomputer. Parameters of the model will be fit to relevant observations and predictions from simulations will supervise further experiments. Our aim is to run simulations efficiently and to describe which network parameters vary across the species and which ones are stable.

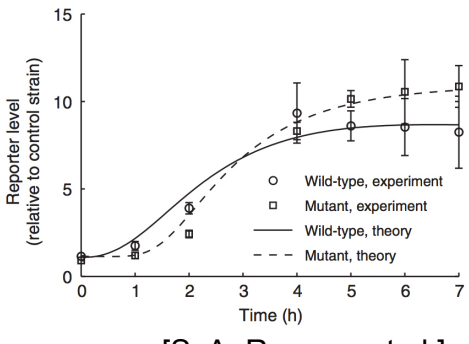


Our expectation is to describe and quantify the variability in terms of **response distribution**, **kinetics** and **dose response**.





[Hsu C et al.]



[S. A. Ramsey et al.]

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